

WHAT IS CLAIMED IS:

1. A Scanning microscope comprising:
 - At least one light source for generating an excitation light beam of a first wavelength and an emission light beam of a second wavelength,
 - microscope optics for focusing the excitation light beam onto a first focal region in a first plane of a sample and for focusing the emission light beam onto a second focal region in a second plane of the sample, whereby the excitation light beam optically excites the sample in the first focal region and the emission light beam generates stimulated emission in the second focal region, and whereby the first and second focal regions are overlapping at least partially,
 - said light source and said microscope optics defining an illumination beam path
 - means for scanning the excitation light beam and the emission light beam onto a sample,
 - components for guiding and shaping being arranged in the illumination beam path, whereby optical properties of the components and of the microscope optics are matched to one another such that optical aberrations are corrected in such a way that the focal regions remain static relative to one another irrespective of the scanning movement.
2. The Scanning microscope according to Claim 1, whereby the aberrations are chromatic aberrations such as axial chromatic aberration, chromatic difference of magnification or lateral chromatic aberration.
3. The Scanning microscope according to Claim 1, whereby the aberrations are monochromatic aberrations such as spherical aberrations or coma or astigmatism, field curvature or distortion.
4. The Scanning microscope according to Claim 1 further comprising: optical correction means for compensating optical aberrations.

5. The Scanning microscope according to Claim 4, wherein the optical correction means act only on the excitation light beam.
6. The Scanning microscope according to Claim 4, wherein the optical correction means act only on the emission light beam.
7. The Scanning microscope according to Claim 4, wherein the optical correction means act on the excitation light beam and on the emission light beam.
8. The Scanning microscope according to Claim 4, wherein the optical correction means involve a lens.
9. The Scanning microscope according to Claim 4, wherein the optical correction means involve a drift section.
10. The Scanning microscope to Claim 4, wherein the optical correction means involve adaptive optics.
11. The Scanning microscope according to Claim 10, wherein the adaptive optics consists essentially of an LCD element, a micromirror or a deformable mirror.